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The American Biology Teacher

Vol. 6 MAY, 1944 No. 8

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The American Biology Teacher

Vol. 6 MAY, 1944 No. 8

Highland Park's School Victory Gardens

M. A. RUSSELL
Victory Garden Supervisor, Highland Park, Michigan

Gardening started in Highland Park, Michigan, a city of about 55,000, as a school project before World War I. During that war some 1400 pupils enrolled to have home gardens. A school farm was also operated. After the war the farm project was dropped, but school gardening was continued until the school district in 1926 faced financial difficulties.

In 1941 an organization of science teachers in Highland Park recognized the need of again starting school gardens. After Pearl Harbor, they knew that gardening was vitally important and needed all the encouragement they could give. The Recreation Department led the way by offering some land in one corner of their play ground for a garden if the Board of Education would build a high fence around it. Also it offered to pay half the expenses of a supervisor for the summer months. The Board of Education accepted the plan and gardening in Highland Park was again launched, under the direction of M. A. Russell.

A committee was formed with a member in each elementary school, junior high and senior high school, for the purpose of carrying out a uniform plan in all the schools. Since World War I, Highland Park has changed from a city of private homes to one of many apartments. Consequently, it was felt that home gardens were not enough, but that community garden plots should be provided. The one on the Recreation Department grounds provided space for 66 pupils. Another was secured on a vacant lot which furnished space for 77 pupils. These community plots were carefully measured and divided up into individual plots 4 by 24 feet with paths between each plot, following the Cleveland and Detroit plans. This enabled the pupil to do his work without having to step on his garden. These plots were worked by elementary school pupils of grades 4, 5, and 6, with a few 7th graders.

HIGHLAND PARK **V** HOME & SCHOOL GARDENS

Enrollment Card

Date_____

Please enroll_____ in the Victory Garden Program of Highland Park. The garden will be at_____. (Number)

_____ (Street)

Parents:- Pupils are to do all the work in the garden except that they may have help in spading, or in case of illness. An inspector will make calls during the summer vacation. He will report garden results to the school and advise on garden problems. Boys and girls may prove their patriotism by completing their gardens and having an exhibit in the School Garden Exhibit in September.

Parents signature_____

Address_____

Board of Education and Recreation Department

FIG. 1. Pupil's enrollment card.

We also had 176 pupils who had gardens at their homes.

We regarded 1942 as the year of getting the project started, as there were many delays in launching the program. Each pupil made out an enrollment card, Figure 1, and kept on a record card, Figure 2, a record of the time he worked on his garden, his expenses, and the produce harvested. The garden supervisor visited each home garden at least twice, and most of them three times. He was at one

Form 24H—6-42—500

PUPIL'S RECORD—HIGHLAND PARK HOME GARDENS

Tack Your Card Up Where You Keep Your Tools

Name_____ **Address**_____

School_____ **Grade**_____

Garden Started_____ **Finished**_____

LABOR RECORD			Expense Record		PRODUCTS USED OR SOLD			
Date	Hrs.	Min.	What I Bought	Cost	Name of Product	Value	Name of Product	Value

FIG. 2. Pupil's record card. This card is printed on stiff cardboard; the reverse side has more spaces for labor records, and products used or sold, as well as a canning record.

HIGHLAND PARK HOME GARDENS

School ..... Grade ..... Name .....

Room ..... Age ..... Address .....

Inspector ..... CREDIT GIVEN .....

Garden score: Date								
1. Cultivation 50 per cent.								
2. Surroundings 10 per cent.								
3. Planting plan 15 per cent.								
4. Insect and disease control 15 per cent.								
5. Effort 10 per cent.								

SCORE .....

Veg. grown .....

Average score .....
Record " .....
Story " .....
Exhibit " .....
Final average

Size:
Remarks:

FIG. 3. Inspector's record card; the reverse side has spaces for a labor record, measured receipts, estimated receipts, amount canned and profit.

community plot twice each week and three times at the other. Figures 3 and 4 show the inspector's record and the certificate awarded to those who completed their projects satisfactorily.

Each pupil was urged to do his own work on his plot whether at home or at the community plot. However, some of the smaller pupils worked with their parents and the garden committee felt that was almost as good as to have the child work alone, for in 1943 it was food we were trying to produce as well as give the children garden instruction and practice. In such cases, the child was credited with a fractional part of the garden, as $\frac{1}{4}$ or $\frac{1}{2}$, depending on the parents' and child's judgment as to the amount of work actually done by the child.

One excellent example of parent-pupil cooperation was seen in an Armenian garden: The boy kept his garden immaculately clean, irrigated it, and even fed liquid manure to his egg plants. Upon one visit to this home garden, the supervisor found the father at home and learned that he was formerly Director of Agriculture at the University of Constantinople. He showed his son how, and the son did the work.

In September each school was urged to have a Garden Exhibit for the pupils to show what they had been able to raise. Four of the schools did so and were much pleased with the results. Later they had an *Achievement Day* when prize certificates and the general certificate for each gardener were given out. In each case the school principal, the garden supervisor, the garden committee member of the school, and usually some interested adults of the community were present and gave short talks regarding the benefit of the gardens.

During the summer kodachrome slides were made of the various garden activities. Later these were shown to the

HIGHLAND PARK V GARDEN

Certificate

In recognition of your patriotic efforts ih having a successful garden this year, _____, the Highland Park Schools and the Highland Park Department of Recreation award this certificate to

_____
Name

_____ _____
School Victory Garden Representative School

_____
Victory Garden Chairman

FIG. 4. Certificate awarded to all who completed their projects successfully.

Board of Education, the School Principals, the Recreation Board, the Garden Club and the Detroit regional conference of the *National Association of Biology Teachers*.

In the fall of 1942, plans were begun for the 1943 season. Garden books were purchased and placed in the hands of each teacher who would attempt to teach the pupils something about gardening. Seeds were bought in bulk and put in penny packets by members of the high school biology club. Tomatoes and other plants were started in school conservatories, or sunny windows. Assemblies were held for all the pupils of garden age and garden talks were given, illustrated by the 1942 slides. Garden programs were also given at exchange clubs, churches and other community organizations, with the result that the enrollment was nearly twice that of 1942. The community plots were increased to five, one of them for the Catholic parochial school. The same general plan was followed as outlined for 1942. Thirty-five different vegetables were raised by the pupils. The leading five in value were tomatoes, string beans, carrots, beets and Swiss chard in that order.

Many of our people hope that when this war is over, school gardening will not be abandoned. The food, health, recreational and educational values are making a strong appeal not only to the parents but to the community as well.

ALL READERS have a standing invitation to send in items for *By The Way*, *Recent Publications*, *and Formulas for Biological Science*. These three have received a most gratifying response, but right at the moment the editor's desk is rather low on material for all three. The summer vacation ought to bring forth some ideas; no matter how simple or old-fashioned an idea or a "teaching-trick" may seem to you, there is someone else who would like to hear about it. So send it in.

SOME GOOD GARDEN BOOKS

The subject of books and literature on Gardening is of necessity a broad one, covering, as it must, the many phases of that time-honored art. It must be as varied too as the interests of the people to whom it is addressed. Since THE AMERICAN BIOLOGY TEACHER is read largely by those who are trained in biological subjects, a few of the books considered will require at least some botanical knowledge.

New books on gardening are coming off the presses in a constant stream. Many of these are reviewed in the magazine FLOWER GROWER. The new books are not always the best books. A book to be classified as good, from the gardener's viewpoint, be he old in experience or only an amateur, should possess the following attributes. It should be simply and interestingly written with a minimum of technical terminology, and profusely and thoroughly illustrated. It should be organized as to soil and climatic adaptability. Culture methods and use of fertilizers should be dealt with in detail as also should disease and insect identification and control. This latter applies particularly to books on vegetable gardening.

SHERLOCK, CHESLA C. *The Gardener's How Book.* Macmillan Co. 1938.

Here is a book that fits superbly into the pattern which has been outlined above. In addition to the discussions of annuals, perennials and bulbous plants, a brief consideration is given to shrubs. The organization, method of illustration, and appeal in style of writing gives evidence of the author's skill.

KAINS AND MCQUESTEN. *Propagation of Plants.* Orange Judd Co. Revised 1942.

An excellent discussion of this most fascinating subject. While it is detailed and might at first appear to be technical, it is written in simple language and is copiously and beautifully illustrated. It is capable of wide geographic adaptation because of content and is used extensively as a text book.

WILDER, LOUISE BEEBE. *The Garden in Color.* Macmillan Co. 1937.

Books by this author never seem to grow old and uninteresting. This book is one which should be possessed by the amateur flower gardener. It is most exquisitely illustrated in color plates, and is written as only Mrs. Wilder writes. Cultural instructions however are limited.

SLATE, GEORGE L. *Lilies for the American Garden.* Scribner. 1939.

A most comprehensive book for a specialized field. Excellent for the amateur who wishes to participate in the joy of producing these glorious flowers in his own back yard. It carries excellent cultural instruction and the information necessary for success in propagating these flowers.

SPENCER, EDWIN R. *Just Weeds.* Scribner. 1940.

The author gives the correct botanical classification as well as the common names. Until one reads this treatise he cannot realize what interesting plants he is determined to exterminate. It is here, too, that one can learn of many real uses for these much maligned plants.

BLAIR, LAURENCE. *The Garden Clinic.* Macmillan Co. 1940.

A complete diagnosis of the ills of many garden species. The topic of insects and diseases is well considered with illustrations a-plenty. The text matter might be considered a bit brief but it does justice to the principal garden favorites.

BLAIR, EDNA, AND BLAIR, LAURENCE. *The Food Garden.* Macmillan Co. 1941.

A splendid discussion of the more commonly grown food garden plants. Like *The Garden Clinic* by one of the co-authors, it is brief, but good and excellently illustrated. In these attributes lies its charm for the amateur.

ROBBINS, ANN ROE. *Anyone Can Grow 25 Vegetables.* Crowell Co. 1942.

The author has very effectively reduced the technical knowledge of the trained specialist in vegetable gardening into terms that are within the concept of the home vegetable gardener struggling to do his bit toward winning this No. II World War. Not only is he helping with food production, but he is making for himself a fuller life. The book deals with each phase of vegetable gardening from preparation of soil through to storage or canning. Climatic maps and frost zone maps are included for the whole of the United States.

FOLEY, DANIEL J., AND WEIKLE, CATHERINE J. *Vegetable Gardening in Color.* Macmillan Co. 1942.

A more experienced gardener might like to carry out suggestions made in this book. It has beautifully colored plates, is brief, but lacks adequate culture information. Very good on varieties that are the best to date.

OGDEN, SAMUEL R. *How to Grow Food for Your Family.* Barnes Co. 1942.

An interesting book, but not too exhaus-

tive. Written from years of experience to help those who have yet to learn the pleasures of gardening for pleasure, and who wish some economic return from pleasant hours spent in these days of economic stress.

FARRINGTON, EDWARD I. *The Vegetable Garden.* Hale, Cushman & Flint. 1939.

Here is a book that is right down on ground level. One who fails with a garden after reading this book must needs be one who will read but fails to heed. One is impressed with the wealth of details covered in this small book.

PLATT, RUTHERFORD. *This Green World.* Dodd, Mead & Co. 1942.

Those who have trained their powers of observation, to the extent that they can really see Nature all about them, will surely want to know this book. Here are brought forth the fascinating features of plant life that the technically trained botanist too often, of necessity, must omit in his analyses. Exquisite photographs in color and black and white are used.

HYLANDER, CLARENCE J. *The World of Plant Life.* Macmillan Co. 1939.

Technically accurate and within the understanding of one who is interested in plants, both native and introduced. Gardeners and members of horticultural societies and outdoor enthusiasts will find this a most valuable adjunct to their library. Profusely illustrated with photographic plates and cuts from detailed drawings of structures and forms.

WYMAN, DONALD (editor). *Hedges, Screens and Windbreaks.* Whittlesley House. 1938.

A compilation of years of experience in this field which has long been neglected. His treatment of good and bad types of plants for hedges gives worthwhile advice to one considering the use of such plants in a planting scheme.

DE LA MARE, A. T. (editor). *Garden Guide.* 1940.

A most excellent book for the amateur home gardener who wants quickly available answers to myriad questions arising on all phases of garden activities. Every amateur gardener should have a copy of this excellently illustrated book.

PEATTIE, DONALD CULROSS. *Flowering Earth.* Putnam. 1939.

This is not a *new* book chronologically speaking, but even so, the writer must confess to not having read it; just scanned it, but having done so he will read it with avidity. A quick perusal of its chapter headings and of here and there a paragraph convinces him that here is an author who sees the broad aspects of sciences in their relation to plants of today and to those that preceded many of the great cataclysmic geological upheavals which in the past began to prepare this gorgeous earth for our human sojourn.

MAUGHEM, SIDNEY. *Earth's Green Mantle.* Macmillan. 1939.

Have you even a slight understanding of the antiquity of the earth; of the geologic forces which have acted upon it and are still acting? Have you an appreciation of the geologists' concept of time or the astronomers' concept of space? Read this author's interpretation of the development of the plant kingdom up to the present and take a look ahead with him. A background of botanical science is needed for full appreciation of this book.

ALEXANDER MACVITTIE,
Mackenzie High School,
Detroit, Michigan

RECENT PUBLICATIONS

OSGOOD, WILFRED H., *The Mammals of Chile.* Field Mus. Nat. Hist. Zool. Series, Vol. 30, Dec. 1943, 268 pp. $1.75.

A comprehensive list, including discussion of physiography and climate, life zones and faunal areas, collection methods, etc. Intended for the specialist, but well within the reading ability of the interested amateur.

KRIEGER, HERBERT W., *Island Peoples of the Western Pacific,* Smithsonian Inst. War Background Studies No. 16, Pub. 3737, Sept. 1943, 104 pp.

Descriptions of the physical features and cultural patterns of the peoples of Micronesia (Pelew, Mariana, Caroline, Marshall, Gilbert and Ellice Islands) and Melanesia (New Guinea, the Bismarck Archipelago, the Solomons, Santa Cruz, New Hebrides, New Caledonia, Fiji Islands). Illustrated with photographs and maps.

Annual Report of The International Health Division, Rockefeller Foundation, New York, 1943. 194 pp.

Report of activities of the year 1942, including special discussion of yellow fever, influenza, typhus, rabies, malaria, and various other nutritional, respiratory and insect-borne diseases. Brief treatment of aid to state and local health services and of public health education. Illustrated, several tabular summaries.

Conservation Unit IV
Biology and Soils

F. OLIN CAPPS
Education Section, Conservation Commission, Jefferson City, Missouri

One of the questions frequently asked by high school students when one suggests that they should include a course in biology in their program of studies is "What is biology?" Possibly the most common reply is that "biology is the study of living things." Additional questions often indicate that many interpret this statement as meaning that such study of living things centers largely around "cutting up a frog."

Fortunately the trend is away from this type of biology teaching to that which attempts to develop an understanding of the interrelationships between all living things and an understanding of the problems which all must solve in order to live successfully in a given environment.

In the newer courses of study in biology and in some biology textbooks the study of soils and soil conservation is being given increased emphasis. This is encouraging but we need even greater recognition of the importance of the problems involved. We know that all life depends, either directly or indirectly, upon the soil. Actually our very existence as a civilization depends upon how wisely we use this resource. Furthermore, the soil itself is considered a living thing, hence any teacher who gives the boys and girls under his direction an adequate background in biology must include such instruction as a part of the course.

The following outline* represents one attempt to provide a guide for the study of soils and soil conservation. An effort has been made to include enough basic facts to build up some understanding of soils, soil conservation and improvement, and the relation of soil conservation to that of other natural resources such as water, forests, and wildlife:

I. GENERAL STUDY OF SOIL

A. The Importance of Soil

1. The soil is the direct source of all plant life.
2. It is the indirect source of all animal life. These two statements apply to the living things of land and water, whether on the continents or in the fresh waters.

* Adapted from a *Teacher's Manual on Soils* prepared by Everett F. Evans and Robert W. Davis under the supervision of a committee representing the State Department of Education, the University of Missouri, and the Missouri Conservation Commission.

Editor's note: This is the last of the present series of *Conservation Units*, prepared by Dr. Palmer and members of his committee on the teaching of conservation. This committee was established at the Chicago meeting of The Representative Assembly, April 24, 1943, with Dr. Palmer as chairman. Other members of the committee are Rudolf Bennitt, University of Missouri; Ollie E. Fink, Conservation Department, State of Ohio; Howard Michaud, North Side High School, Fort Wayne, Indiana; F. Olin Capps, Missouri Conservation Commission. All the units have been arranged in the middle of the magazine, so they may be removed without disturbing the remainder of the articles. The committee is considering the continuation of the series, which seems to have met with general approval. There is a possibility that all units may be combined and made available as a separate publication, although arrangements for such have not yet been made. If you are interested in the continuation of the series, if you have some suggestions for the improvement or extension of the functions of conservation teaching, if you know of someone who would make a valuable contribution to future units, or if you want to volunteer your services, write to the editor or to the chairman of the Conservation Committee, Dr. E. Laurence Palmer, *Rural Education Department, Cornell University, Ithaca, New York.*

3. Man depends upon plants and animals and their products; therefore he depends upon the soil from which they come.
4. A nation's progress depends largely upon the abundance of its products for use and export. Therefore we may say that the soil, as the source of most of these products, is the ultimate source of most wealth. (Exceptions, of course, are the wealth derived from the sea and from minerals and other products of the earth's crust.)
5. The soil is not the property of one generation; it belongs to all generations. Once destroyed or badly damaged, it may never be completely replaced.
6. The welfare of all occupational groups is affected in some way by the health and productivity of the soil.
   a. Farmers must sell food and other products of the soil in order to buy manufactured goods.
   b. City workers must sell their products and services in order to buy food, clothing, building-materials, and other necessities.
   c. If either country people or city people are to prosper, both groups must prosper.
7. The soil of our country is in danger. We must learn about soil if we are to know how to cure a "sick" land.

B. The Composition of Soil

1. Minerals are changed into soil-particles as a result of physical and chemical breakdown of rocks.
2. Organic matter is added to the soil by the decay of plant and animal tissues.
3. The principal plant-nutrients—materials which nourish plants—contributed by the soil are: nitrogen, phosphorus, potassium, and calcium. Other nutrients used in small quantities are: magnesium, sulphur, iron, manganese, boron, copper, zinc, etc.
4. Organic matter increases fertility in the following ways:
   a. Organic matter contains some nutrients such as nitrogen, phosphorus, and potassium.
   b. Organic matter adds some nitrogen to the soil. Leguminous plants contribute organic matter containing nitrogen taken from the atmosphere by bacteria.
   c. Organic matter increases the activity of bacteria which produce chemical changes in the soil. For example, bacteria use the nitrogen contained in organic matter and help to hasten the decay of plant material. Nutrients which are not in usable form are thus changed chemically so that they can be used by plants.
   d. Organic matter has colloidal value. This means that it increases the fertility and improves the structure of the very small or colloidal soil particles.
5. Organic matter increases the water-holding capacity of soil by making it easier for water to penetrate it, and in other ways. This is important for two reasons:
   a. An increase in the capacity of soil to absorb and hold water reduces the volume and swiftness of the runoff —*i.e.*, the water that flows off the land without being absorbed. Reducing the runoff reduces the amount of erosion.
   b. The greater the water-holding capacity of the soil, the greater will be the amount of water available for plant use. This is especially important in dry climates and during dry seasons.

C. Agencies That Form and Transport Soil Materials

1. Wind transports soil and soil-building materials such as leaves, depositing them in layers. The name "loess" is sometimes given to wind-deposited soil.
2. Water is probably the most important agency that decomposes minerals and transports large quantities of soil at the present time. Water-deposited soil is known as "alluvial" soil.
3. Glaciers had great influence in breaking up rocks and transporting soil-building materials during earlier periods in the earth's history; today, however, there is relatively little glacial action and none in our part of the country.
4. Plants and animals are the chief contributors of organic matter to the soil at present. A tree produces a crop of leaves each year, which soon decay and add organic material to the soil. Tree-roots grow through cracks in the rocks, causing them to break into smaller pieces. Animals return much of the food they eat to the soil in the form of manure; they also dig burrows, bringing soil to the surface from depths of several feet; and their bodies return to the soil when they die. The holes made by worms and larger animals permit air and water to penetrate the soil more readily.
5. Freezing and thawing cause rocks to break and decay, which hastens their formation into soil-particles.

D. Classes of Soils; Soil Texture

1. Gravel consists of tiny rocks. A gravelly soil contains very little organic matter and is not fertile.
2. Sand contains the next-smaller particles.

The size of sand particles varies from very fine to coarse. A sandy soil is usually well-drained but it lacks organic matter.

3. Loam is a mixture of sand, silt (a very fine sediment carried and deposited by water), and clay in such proportions that none of these materials predominates.
4. Clay contains the smallest particles and absorbs water very slowly. It has a wide variety of colors, from yellow to black, depending on the amount of organic matter present.
5. A fifth soil, peat, is made up almost entirely of organic matter deposited by plants in marshes and similar low, wet places. A soil is called peat if it contains as much as 50% of organic matter.

E. The Soil Profile

1. The surface layer of soil, commonly called the topsoil, may vary in depth from a few inches in some regions to several feet in others. The topsoil contains practically all of the organic matter and therefore much of the nitrogen. The removal of surface soil by erosion greatly reduces the fertility, and eroded soil produces much less vegetation than before. In turn, the decrease of vegetation means that there is likely to be more damage from erosion, because the soil is not held in place; this is another "vicious circle."
2. The subsoil contains practically no organic matter, and it usually differs from the topsoil in color. On some badly-eroded farmlands the original surface layer has already been lost and the subsoil is being cultivated, though its productivity is of course very low.
3. The parent-material is made up of the rocks and other inorganic matter which are the raw materials from which the mineral part of the soil is made.

II. THE SOIL WATER

A. Kinds of Soil Water

1. Gravitational water includes both surface water and underground water.
   a. Surface water is that which collects in depressions in the surface of the ground. This either evaporates gradually or soaks into the ground.
   b. Underground water collects in crevices and forms underground "veins"; it is these veins which are tapped by wells. The level which this underground water maintains is known as the water table. In regions which have a great deal of rainfall, as in most parts of the East, the water table may be near the surface; elsewhere the water table is lower.

Fig. 1. Wind erosion in Southeast Missouri. Photo by Missouri Conservation Commission.

2. Capillary water occupies the spaces between soil particles and moves from one soil particle to another. It is of little importance to plant growth, for plant roots generally grow downward to get moisture instead of depending upon moisture coming upward by capillary action.
3. Hygroscopic water makes up an invisible film which coats each soil-particle. This water is not available to plants at all.

B. Movements of Soil Water

1. Percolation is the downward movement of water among the soil-particles; it is caused by the weight of water drawn downward by gravity.
2. Capillarity is the movement of water in any direction from one soil-particle to the next, drawn by the same capillary action that draws water into a brush or ink into blotting-paper.
3. Runoff is the movement of excess water into ditches and streams. In the strict sense of the term, the runoff water is not soil water because it does not become part of the soil and is not available to plants; actually, it does much damage by eroding surface soil.

C. Results of Rainfall

1. On the average, about 25% of the water which falls on the land runs off, the amount varying with the slope, density of plant-growth, soil texture, organic content of the soil, and other features of the land. Under present farming practices in Missouri, an average of about 50% of the rain which falls runs off at once without benefiting the soil.
2. About 20% of the rainfall, on an average, returns to the atmosphere by evaporation. This amount also depends upon the condition of the soil and its vegetation as well as upon the temperature. In cultivated fields the amount of evaporation can be

reduced by maintaining on the surface a dust mulch, which is a layer of finely-pulverized soil. A heavy growth of vegetation also tends to prevent evaporation.

3. About 25% of the rainfall is absorbed by the soil and is used by plants. One of the objectives of both erosion control and water conservation is to increase this fraction of the rainfall, so that more water is made available for plant growth.
4. About 30% of the rainfall percolates through the soil to deeper levels and becomes part of the underground water. It is from this reserve that wells and springs derive the water which they bring to the surface.
5. On the basis of these averages, a 40-inch rainfall (which is about what most of Missouri receives in a normal year) would be accounted for as follows: Runoff—10 inches; evaporation—8 inches; used by plants—10 inches; to underground water—12 inches.
6. The amount of moisture used by plants is well illustrated by the fact that some 576 tons of water are required to produce one ton of dry clover. Because of the enormous amounts of water required by crop-plants, it is important that farming practices should be planned with a view to reducing the amount of runoff. Such practices would decrease the amount of erosion and would increase the amount of water retained in the soil for the use of plants.

FIG. 2. A small section of one badly gullied field; of the entire 14 acres in this field, only three can be cultivated. The field was planted to soybeans in the spring of 1925; following the harvest, hard rains started gullies. No winter cover was provided, and the next year corn was planted. The gullies rapidly became larger, the field being abandoned in 1937. This farm had about the average fertility of the neighborhood; it is now almost worthless. Erosion removes that part of the soil that is rich in plant nutrients and exposes the less fertile subsoil. Soil Conservation Service Photograph.

D. Artificial Drainage and Irrigation

1. The most common method of drainage is by means of open drainage ditches.
2. Another method of drainage is the placing of tile drains in parallel lines underground, or in main lines with rows of smaller tile leading to them.
3. In Missouri drainage is a problem only in the lowlands bordering rivers.
4. When the normal rainfall is less than 20 inches per year irrigation is necessary for successful crop production.
5. The western part of the United States contains an area of some 50,000 000 acres of rich soil that needs only an abundance of water to make it highly productive.
6. Approximately 20,000,000 acres of land in the United States are already being cultivated under irrigation.

III. SOIL CONSERVATION

A. Factors Which Damage the Soil and Impair Fertility

1. Erosion, which removes the soil, is of two kinds:
   a. Water erosion occurs when the runoff washes away the soil from sloping land. This is the most serious type of erosion in all parts of the United States except those which have very little rainfall.
   b. Wind erosion is most serious in the Great Plains states which have a low annual rainfall (below 20 inches). Kansas, Oklahoma, Texas, Colorado, and the states directly north of them are most noted for the wind erosion, which is often so severe as to cause dust storms or "black blizzards."
2. Cropping damages the soil in several ways. Such crops as corn, wheat, tobacco, cotton, millet, or sorghum require a good deal of plant food, especially nitrogen, phosphorus, potassium, and calcium. During the growing season the plants use nutrients from the soil in producing their stems, leaves, fruits, and seeds. Unless these nutrients are restored to the soil, each succeeding crop reduces the amount available for subsequent crops.

B. Extent of Erosion-Damage in the United States and in Missouri

1. In the United States:
   a. The original productivity of the soil has been reduced, on an average, by about one-half.
   b. Within the last century approximately 50 million acres have been permanently ruined for crop-pro-

duction. Another 50 million acres have been seriously damaged, and 100 million acres have been partly depleted by erosion. On still another 100 million acres erosion has started and will proceed rapidly under present farming practices. In all, 300 million acres have suffered to some extent—an area almost twice as large as the state of Texas.

c. The annual national loss from erosion has been estimated at $400,000,000.

2. In Missouri:
   a. The original productivity of the soil has been reduced, on an average, by about one-third.
   b. The nitrogen content of Missouri soils has been reduced by about 35% and the content of organic matter has been reduced by 38%.
   c. About three-fourths of the land in Missouri has lost at least one-fourth of its topsoil.

C. Land-Use Practices Mainly Responsible for Erosion

1. An important though indirect cause of land abuse is that farmers have failed to realize the extent to which their soils are being destroyed.
2. Many slopes so steep that their soil ought not to be laid bare have been cultivated continuously for years. Experiments conducted in Missouri to determine the effect of slope on erosion have shown that land having a slope of more than 6% or 8% (a 6% slope rises 6 feet for every hundred feet of advance) should be kept in grass or trees.
3. The practice of planting rows up and down the slope, which makes perfect channels for the runoff water to rush down.
4. Unwise cropping systems, especially the continuous use of one crop on the same land because it removes more and more of the same soil-materials.
5. The plowing of prairie land in the dry regions has destroyed the native grasses that are well adapted to such surroundings, leaving the soil exposed and subject to erosion by the wind.
6. The removal of timber from steep slopes has been especially serious because (a) erosion has been hastened and (b) the country's supply of lumber has been badly depleted.

D. Principal Results of Erosion

1. Erosion removes that part of the soil (the topsoil) which contains most of the organic matter. This reduces the organic content of what is left, reduces its water-holding capacity, and increases the runoff. Unless erosion is controlled, these effects are cumulative, increasing year by year.
2. Erosion exposes a part of the soil profile that has a different structure from the topsoil. As the organic matter is removed there is a tendency for the soil particles to become smaller; air-spaces between them become smaller and conditions are less favorable for the action of the soil bacteria. There is also a greater tendency for the soil to pack and become "cloddy" if cultivated before it has sufficient time to dry out.
3. Erosion removes that part of the soil which contains most of the plant nutrients and exposes the subsoil which is lower in fertility. This factor is closely related to the removal of organic matter, since it is the latter that contains most of the nitrogen. Lime is especially susceptible to the influence of leaching (the process of dissolving out by water) because it is easily dissolved. Most badly-washed fields show a deficiency of lime because the exposed subsoil has been leached of lime.
4. Erosion forms ditches and gullies which make the use of farm machinery difficult, sometimes impossible.

E. Control of Erosion

1. General farming practices which help to reduce erosion and conserve soil fertility include the following:
   a. Slopes of more than 6% should be kept in meadow, permanent pasture, or woods.
   b. Pastures should not be too closely grazed, especially in dry seasons. Such grazing results in thinner stands of grass and leaves the ground less fully protected.
   c. Crops should be planted across the slopes, that is, on the contours, instead of up and down the slopes.
   d. A form of crop rotation should be practiced that is adapted to soil conservation in the region concerned.
2. Special methods of erosion control include the following:

a. *Contour farming* is the practice of planting crops in rows which follow the same level across the field. Contour lines are laid out by sighting at different points with a farm level, then running a shallow furrow to connect these points. The level is then moved toward the top of the hill and another line is determined. The number of lines used depends upon the size of the crop plant and the steepness of the slope. On long, steep slopes it is necessary to lay out more lines than on smaller, more gradual slopes. After the

guide-lines are made, the rows are planted parallel to them. Since the points having the same level are often not in a straight line, the rows may be curved. Some farmers object to this feature of contour farming because such rows are a little harder to cultivate than straight rows are; but the yields are usually higher.

b. *Strip cropping* is similar to contour farming, except that strips of different crops are planted along the contours. These strips may be rotated, just as rotation is practiced in whole fields. Some farmers object to strip cropping because it divides a field into several small pieces, planted to two or more crops.

FIG. 3. Strip cropping; the top strip has been plowed for corn, the second is in wheat and the third is being plowed for alfalfa. Soil Conservation Service Photograph.

c. *Terracing* is the practice of constructing low ridges on the contours so that each terrace channel on the upward side carries away the runoff from a strip of land between it and the next terrace above. The distance between terraces depends upon the steepness of the slope: the steeper the slope, the closer together the terraces should be. Terrace lines are first laid out in much the same manner as contour lines. More accuracy in sighting is required, however, for terrace lines may follow the same level at all points or they may be made to follow a slight slope from one end to the other for drainage. Farmers who have had no experience in terrace construction should secure the advice of the County Agent or the Soil Conservation Service. The terrace outlet should be constructed before the terrace is made. Since the outlet must carry water from all the terrace channels, it should have a sod or rock bottom; otherwise a gully may result. Terraces are usually constructed with tractor and grader or with a terracing machine; however, they can be made also by using a plow and a small V-shaped drag.

FIG. 4. Terracing; farm near Marshall, Missouri. The distance between terraces depends on the steepness of the slope. Missouri Conservation Commission.

d. *Control of gullies* is the fourth special method:

(1) One of the most effective methods of control is the planting of trees in gullies. Best adapted for this purpose in Missouri are willow and black locust.

(2) Board checks are sometimes placed at regular intervals across small ditches. However, since the wood decays in a few years this type of check is not entirely satisfactory.

(3) Wire checks, consisting of woven fence-wire stretched across the gully, are probably more satisfactory than board checks.

(4) Straw and brush are commonly used to catch soil in small gullies, but unless held in place by wire checks they may soon wash away.

(5) Earth dams may be constructed across large gullies, but they should have tile outlets to which additional lengths of tile can be added as the soil accumulates in the bottom of the gully.

(6) Concrete dams are the most effective for large gullies, but the expense prevents their widespread use by farmers.

(7) Various other structures are used in stopping gullies, and directions for building them can be had from the County Agent.

IV. SOIL IMPROVEMENT

A. Increasing the Inorganic Content

1. Plowing under green manure crops such as rye, sweet clover, or soybeans is the most effective means of adding large quantities of organic matter to the soil. Merely growing these crops, without plowing them under, does little good in this respect. It should be remembered, however, that there is a limit to the amount of organic matter which a given soil can hold. This limit is determined by the fertility, especially the nitrogen con-

tent. The more fertile the soil, the greater its capacity to utilize additional organic matter. The reason for this is that the decay of plant tissue is dependent upon the action of bacteria, and these bacteria must have an adequate supply of nitrogen in order to carry on their work. The plowing under of large quantities of material poor in nitrogen may actually retard the growth of the next crop. When bacteria need more nitrogen than is present in the material being decomposed, they draw on the supply of available nitrogen in the soil, thus bringing about a temporary shortage.

2. Barnyard manure is valuable as a source of both organic matter and nitrogen. Manures are low in phosphorus content, however, and need to be supplemented by superphosphate or some other fertilizer.

3. Artificial manure (compost) can be produced from straw, weeds, cornstalks, and the like by piling it in such a manner that it will absorb water and by adding suitable proportions of lime, phosphate, and ammonium sulphate. These fertilizer-elements furnish food for bacteria which cause the decay of the organic matter—food that is too deficient in the dead plants mentioned above. The addition of fertilizer makes possible a more rapid growth of the soil organisms, which brings a rapid breakdown into compost.

4. A crop rotation which includes such legumes as red clover, sweet clover, or lespedeza does much to maintain the organic content of the soil provided these legumes or significant quantities of their residues (such as manure produced by animals to which legumes have been fed) are incorporated into the soil. One of the best rotations for Missouri conditions is a four-year rotation of corn-oats-wheat-clover. Legumes add nitrogen to the soil by means of the process known as "nitrogen fixation." Certain kinds of bacteria have the ability to take nitrogen from the air in the soil and to use it in their own activities. These "nitrogen fixing" bacteria find their way into the outer tissues of legume roots and their rapid multiplication causes the formation of nodules where they remain. Different legumes require different strains of bacteria, so legume seed should be "inoculated"—that is, treated with the proper strain of bacteria—before planting. If it is desired to add nitrogen to the soil by nitrogen fixation, an amount varying from 40 to 80 pounds per acre per year can be added by growing a heavy crop of sweet clover and turning it under as green manure in the spring.

B. Increasing the Mineral Content

The mineral elements of the soil—nitrogen, phosphorus, calcium, potassium, etc.—may be added in the form of commercial fertilizers. This method of improving soil fertility, however, is expensive. Lime, in the form of crushed limestone, increases crop yields and makes possible the growing of legumes such as sweet clover, red clover, and alfalfa which can then add nitrogen to the soil by nitrogen fixation. The use of lime is the first step in soil improvement and must soon be followed by further improvement practices, including the addition of other fertilizers, if the fertility of the soil is to be increased.

V. THE RELATION OF SOIL CONSERVATION TO WATER CONSERVATION

A. Three Special Problems in Water Conservation

1. Increasing the water content of farmland insures adequate moisture for crop growth and maintains the level of the water table.
2. Reducing the runoff from farmlands reduces the volume of water which the small streams empty into the larger rivers; thus it helps to prevent floods.
3. Controlling the runoff in agricultural regions tends to maintain a more uniform stream-flow and thus to stabilize conditions in the streams themselves, which then become more depenbable as sources of water or fish.

B. Relation of Erosion Control to Water Conservation

1. Reducing the runoff increases the amount of water that soaks into the soil. Part of this increase goes to maintain more plant-growth; the rest goes to the underground water which may be tapped by wells.
2. Reducing the runoff reduces the soil-carrying capacity of the water. This keeps the soil on the land, prevents the accumulation of silt in the streams (this is especially important above power-dams), allows the streams to produce more fish and other aquatic life, and reduces the amount of dredging necessary to keep navigation channels open.

VI. RELATION OF SOIL CONSERVATION TO OTHER PHASES OF CONSERVATION

A. Relation to Forest Conservation

1. One of the basic practices in erosion control is the planting of trees and grass on steep slopes. This is also an essential feature of the reforestation program.
2. The presence of trees on the watersheds is an important factor in flood control and stream improvement.

3. The transfer of steep farmlands from cultivation to the growth of grass and trees implies that the crops formerly produced on these slopes must hereafter be grown on other areas, more fertile and less subject to erosion. This raises the problem of maintaining the fertility-level of the better soils which must carry the burden of increased production.

FIG. 5. Farm pond near Hatton, Missouri. Completed in spring of 1937. Pines, ash and hackberry have been planted. Introduction of aquatic and swamp plants provide food and cover for wildlife, as well as protection against erosion. Soil Conservation Service Photograph.

B. Relation to Wildlife Conservation

1. The development of agriculture, with more and more land used by Man, less and less left in its natural state, greatly changed the surroundings of wildlife. Cover has been reduced; much native vegetation has been replaced by crop plants; the distribution of water has been changed by drainage, irrigation, creation of artificial lakes, and in other ways. Thus for a great many of our most valuable wildlife species the amount of available range has been reduced and its quality made poorer.
2. The restoration of trees and grass on farmland slopes improves the surroundings of birds, game mammals, and fur-bearers.
3. Reduction of the runoff, with the resulting stabilization of streams, greatly improves conditions for fish and other life of the ponds and streams.
4. In general, anything that improves the soil improves the products of the soil; these products included wildflowers, trees, and wildlife as well as domesticated plants and animals.

C. Relation to Conservation of Mineral Resources

1. Minerals, oil, natural gas, and the like are usually taken from land not used for agriculture. Therefore there is little direct connection between their conservation and that of the soil.
2. However, as minerals become less abundant, the only alternative is to develop substitutes (as in the German "Ersatz" movement) from plant and animal sources.
3. This means that more crops must be produced, which places a further burden upon the soil and furnishes one more reason for saving and improving the soil in every way possible.

HORIZONTAL PLOWING

The following is from a letter written by *Thomas Jefferson, dated May 2, 1817*, in which he discussed various agricultural practices:

". . . it has already become very general, and has entirely changed and renovated the face of our country. Every rain, before that, while it gave a temporary refreshment, did permanent evil by carrying of our soil . . . at present we lose none of our soil, the rain not absorbed at the moment of its fall being retained in the hollows between the beds until it can be absorbed. Our practice is . . . to lay off guide lines conducted horizontally around the hill or valley from one end to the other of the field, and about 30 yards apart. . . . A man or lad, with a level, and two small boys, the one with sticks, and the other with a hoe, will do an acre of this in an hour. . . . The intermediate furrows are run by the eye of the plough-man, governed by these guide lines. The inequalities of the declivity in the hill will vary in places the distance of the guide lines and occasion gores which are thrown into short beds. As in ploughing very steep hillsides horizontally a common plough can scarcely throw the furrow uphill, Col. Randolph has contrived a very simple alteration of the share, which throws a furrow down hill both going and coming . . . horizontal and deep ploughing with the use of plaster and clover . . . will, as we believe, restore this part of the country to its original fertility. . . ."

President's Page

The *American Association for the Advancement of Science* has secured the consent of the ODT to have its annual meeting in Cleveland, September 11 to 16. We have our annual meeting with the A.A.A.S.; Friday, the 15th, the Representative Assembly, and Saturday the 16th, our program. The meeting the 15th is for officers of the Association, past presidents, advisory staff, editorial board, and presidents of local associations. Please mark this date on your calendar. The program on Saturday is for all our members who can possibly get there. It will start in the morning, continue in the afternoon, and conclude with a dinner. Dr. A. J. Carlson, University of Chicago, President of the A.A.A.S., has consented to be our guest and main speaker. The complete program will be mailed to your journal address during the summer. *The Greater Cleveland Biology Club* will appoint a committee for the local arrangements.

At the time of this writing, I have just returned from Pittsburgh, where I had dinner with the Biology Club of Southwestern Pennsylvania, although the main reason for going was the meeting of the National Science Commission. Ten science groups were represented. We are trying to create an overall science teacher organization that will be affiliated with both the N.E.A. and the A.A.A.S. The committee drew up a constitution and by-laws that enable them to act as a board of directors until the interested sicence groups can ratify the constitution and elect officers. From many sources came the wish that no new organization be formed. The plan calls for two of the present groups, the *American Science Association* and the *National Council of Science Teachers* to merge into a new organization called the NATIONAL SCIENCE TEACHERS ASSOCIATION which we will all support. Presidents Meister of the A.S.A. and Jones of the N.C.S.T. favor the plan and think the merger can be accomplished. How will this affect the N.A.B.T., the Chemistry teachers', and the Physics teachers' organizations? No one thought but that they should continue the good work they are now doing. Their hope is that they will support the new organization as affiliated organizations and that the individual members of our organizations will also become members of the National Science Teachers Association. This will be an important item of business to be considered at our Representative Assembly meeting Sept. 15. I hope I will receive enough copies of the constitution and by-laws so I can mail them to Assembly members during the summer.

This is my farewell as your president. The two years I have had that honor have been eventful ones. Our New York annual meeting for December 1942, which we had worked hard to make a success, was cancelled. Our membership dropped to 1112 in July 1943. The financial condition was so alarming, that we had to raise the dues for 1943–44. Sec.-Treas. Houdek declined to continue another year.

At our Representative Assembly meeting in Chicago in April 1943 we appointed Dr. Jeffers Secretary-Treasurer, and Miss Knauz Chairman of the Membership Committee. Results indicate they were wise appointments for they, with the help of the rest of us, have raised our membership to 1600, and the financial situation has improved considerably, though we are still in the red. I want to express appreciation for the work of Mr. Price. He has contacted advertisers and kept up that important part

of our journal during these difficult times. Our editor merits our thanks for the excellent journal we have been having. It takes a lot of time, energy, and editorial ability to do what he has done. Miss Trowbridge and Mr. Whitaker have made important contributions to the operation of the N.A.B.T. Your officers for next year, with the possible exception of the Secretary-Treasurer, are capable and resourceful people. I predict a good year. We are all sorry that Dr. Jeffers will not continue, but he absolutely refused before I consented to run for that office.

Shailer Peterson's article about army tests in the December Journal interested me very much; so I wrote him offering our help. His reply indicated that he would like several biology teachers to give trial tests. By correspondence with presidents of local associations, I found about 15 teachers who would like to help in this way. Thus these tests will be tried out in schools all the way from Pittsburgh to California.

Miss Knauz was our delegate to the annual meeting of the *Union of American Biological Societies* in Philadelphia. They are still much interested in the N.A.B.T. and help us all they can. They financed the "Gremlin" letter that was sent out last spring. Miss Knauz says she is still getting replies to that letter.

Being president of the N.A.B.T. has taken a lot of time and energy, but I have enjoyed it. Thank you for the honor.

M. A. Russell

FROM THE SECRETARY

Starting July 1, your new secretary-treasurer will be Mr. M. A. Russell, Royal Oak, Michigan, to whom all correspondence should be addressed after that date. Before leaving office I should like to leave matters in reasonably good shape. Therefore, I should like for all who have failed to receive any issue of the magazine this year to notify me at once. Each member is entitled to eight issues per volume and we want you to get them. The work this year has been rushed at times, I have been new at the job, and the publisher has been shorthanded. Hence there must be a number of members who have missed out on some numbers of the magazine.

It is not too early to send in your membership dues for 1944–45. By paying in advance you help us materially because during the summer there is more time in which to keep records straight. Early renewals give the officers more time to devote to other matters next fall.

During the year we have reduced our indebtedness considerably and next year should find us free of debt. This hopeful outlook is due to increasing the dues to $1.50 and to a 35% increase in membership. If any member feels disposed to make his or her check a little bit bigger, the excess to be applied to the reducing of the debt, it will be greatly appreciated. Nothing would please me more than to turn the books over to Mr. Russell debt-free, and it is possible. Any such donations received will be applied to the deficit, but every penny of 1944–45 dues will be turned over intact to next year's budget. Whether you donate anything or not, please continue the good work of introducing us to your friends. More members will strengthen *The National Association of Biology Teachers*, and I foresee a great future for our organization.

Nothing remains but to thank you one and all for your consideration and forebearance during the past year, and to bespeak your continued cooperation with Mr. Russell.

G. W. Jeffers

ABOUT OURSELVES

In the November 1943 issue of the AMERICAN BIOLOGY TEACHER, the editor addressed a letter to the readers of the magazine, setting forth the editorial purposes and plans. It was frankly stated that in the formulation of policies he and his staff try to include in the journal the features that the readers want. This is no easy task; not many readers accept the invitation to send in their views. The editor relies to a large extent upon information available in the files of the secretary. The latter has compiled a list of reader preferences as expressed on application, membership, and renewal cards. Not all readers received such cards, and not all who received them checked the blanks, but many did—almost 400 responses have been recorded. Some of the data are of such interest to justify publication.

The following numerically arranged list probably represents a fairly accurate poll of reader interest, the sampling being relatively large and well distributed. All but five states were represented. The total is, of course, far more than 400 since almost everyone who responded checked more than one item.

Teaching Technique	162
War Relations of Biology	143
Visual Aids	136
Laboratory Methods	136
Health and Hygiene	130
Conservation	118
Experiments	112
Field Trips	106
Consumer Biology	101
Biology Clubs	100
Book Reviews	86
Research	65
Equipment	51
Contributing Articles	31
News	30
Junior Academy of Science	25

Junior Sciences, Editorials, Nature Study, Gardens, Projects, Entomology, Genetics, Botany, Class Room Problems, Flora and Fauna, Anatomy, Nutrition, Sex Education, Taxidermy, ranged from 21 down to 1.

Although we are still far short of Miss Knauz's goal of 3,000 there has been a considerable increase in membership. The geographic distribution is better than in the past, even though there are still large areas in which we are not represented. About half our readers live in a total of six or seven states, but this is not surprising, since these are in general the states with large populations and large cities.

The following list is approximately correct for April 1, 1944:

Alabama	14	Michigan	84	Texas	22
Arizona	7	Minnesota	31	Utah	1
Arkansas	3	Mississippi	7	Vermont	3
California	126	Missouri	23	Virginia	23
Colorado	8	Montana	10	Washington	22
Connecticut	23	Nebraska	8	West Virginia	20
Delaware	2	New Hampshire	11	Wisconsin	45
District of Columbia	24	New Jersey	62		
Florida	4	New Mexico	3	Alaska	1
Georgia	2	New York	153	Brazil	1
Idaho	5	North Carolina	12	Canada	7
Illinois	188	North Dakota	1	Canal Zone	2
Indiana	68	Ohio	126	Costa Rica	1
Iowa	31	Oklahoma	14	Cuba	1
Kansas	29	Oregon	29	Hawaii	2
Kentucky	13	Pennsylvania	160	Mexico	1
Louisiana	9	Rhode Island	9	Peru	1
Maine	10	South Carolina	8	Puerto Rico	4
Maryland	22	South Dakota	7		
Massachusetts	80	Tennessee	13	Total	1,586

JOHN BREUKELMAN, G. W. JEFFERS

FROM THE MEMBERSHIP COMMITTEE

SAVE THESE DATES:

SEPTEMBER 16, 1944, for the National Convention of
The National Association of Biology Teachers,
affiliated with
The American Association for the Advancement of Science
in CLEVELAND, OHIO

Also, JULY 4, 1944—Regional Meeting sponsored by *The Biology Teachers Club of Southwestern Pennsylvania*

at Pittsburgh Garden Center and Buhl Planetarium, Pittsburgh, Pennsylvania. (To reach Center from downtown Pittsburgh, take any Forbes Street car 64, 66, 67, 69 to the Carnegie Museum stop; the Center is a five-minute walk from this stop.) The tentative program is as follows:

9–10 A. M., *Registration* in the Garden Center.

10–11:30 A. M., *Field Natural Science Workshop,* Dwight Sollberger, State Teachers College, Indiana, Pennsylvania.

11:30 A. M.–1:30, intermission for lunch.

1:30–2:00 P. M., G. W. Jeffers, State Teachers College, Farmville, Virginia, subject to be announced.

2:00–3:00 P. M., *Workshop in Heredity,* Phyllis Cook Martin, Pennsylvania College for Women, Pittsburgh, Pennsylvania.

6:00 P. M., *Dinner,* place to be announced.

7:30 P. M., *Demonstration of Buhl Planetarium,* Downtown, North Side, Peter Gray, University of Pittsburgh.

8:30 P. M., *Sky Show,* in the Planetarium.

Lack of space prevents proper expression of thanks and appreciation to the various state chairmen for their untiring efforts in the important business of membership. Besides those mentioned in a previous note, Ruth Beatty, Oregon; Warren Bartlett, Massachusetts; Dwight Sollberger, Pennsylvania; Joanna Wells, Texas; Maurice Bleifeld, New York; C. M. Farmer, Alabama; Ruth Dodge, New York; and Glen Chamberlin, Maine, are among those whose recent activities have indicated great interest in their respective states. Many others have been active, but have not written the chaiman about their activities.

It is hoped that May will bring renewed interest among state chairmen and their committees, especially among biology teachers who have not yet found a place on our membership list.

The Membership Committee is especially anxious that as many as possible renew their memberships now, instead of waiting until fall.

MARIE KNAUZ, *Chairman,*
Peabody High School,
Pittsburgh 6, Pennsylvania

OFFICERS FOR 1944-1945

The results of the recent election of officers of *The National Association of Biology Teachers* have just been announced by E. C. Colin, chairman of the Election Committee. The officers are as follows:

President, Helen Trowbridge, Glen Ellyn, Illinois.

President-elect, Prevo L. Whitaker, Bloomington, Indiana.

First Vice President, Marie Knauz, Pittsburgh, Pennsylvania.

Second Vice President, Betty Lockwood, Detroit, Michigan.

Secretary-Treasurer, M. A. Russell, Royal Oak, Michigan.

The new president is a biology instructor in Glenbard Township High School, Glen Ellyn, Illinois. She is a graduate of the University of Chicago and holds the degree M.S. from the University of Michigan. She has been an active member and officeholder in the Chicago Biology Round Table, Illinois Biology Teachers Association, Illinois Curriculum Committee and other educational organizations. She has been an active member of the *National Association of Biology Teachers* since the beginning and has contributed much to its success. She has been a national officer for the past three years. She has served as chairman of the Chicago Regional Meeting, Delegate to the National Convention, and Associate Editor of the journal.

Biographical sketches of the other officers were published in the February issue of THE AMERICAN BIOLOGY TEACHER. All of them have been active workers in the organization and can be depended upon to give their best efforts to the advancement of biology teaching. The editorial staff extends, on behalf of the entire organization and the journal, congratulations and best wishes for a happy and successful year of service.

Biological Briefs

BANKS, W. J. *Doves of War.* Fauna 5: 98–101. December, 1943.

Homing pigeons are saving lives and performing valuable messenger duties for the Allies. The feats of several pigeon heroes have been recognized in Dieppe, North Africa, and Guadalcanal. Pigeons were domesticated 5,000 years ago in Egypt, and were used as messengers by Solomon, the ancient Persians, and the Greeks. The development of fine homing breeds, however, waited until the 19th century, when they served to carry bank quotations and news. In the present conflict, pigeons carry messages from patrol and reconnaissance planes, from raiding parties, and from disabled planes, where radio would reveal information to the enemy. Private owners have turned over valuable stocks to the U. S. Signal Corps for the duration. Intensive breeding and improved training methods are constantly raising the level of performance. Homing flights of more than 200 miles and average speeds of 70 miles per hour are often made, and now birds are trained to return to mobile lofts in a truck or trailer. To prevent the carrying of messages to the enemy, all pigeons in England have been inspected and forced to fly; for the same reason, the Germans have killed thousands of birds in occupied lands. The dove of peace is now all out for war.

DAVIS, ELRICK B. *Tree Rings for Victory.* Nature Magazine 36: 483–484; 500. November, 1943.

Long-time weather forecasting is of great value in planning campaigns, and here is one of the realms in which tree-ring study is of value. Tree growth may be correlated with weather conditions, which in turn depend to some extent on the 11-year sunspot cycle. By correlating such studies on trees from various parts of the world, a global weather history charting a basic pattern of weather "velocity" and trends may be made. The forest operator also uses tree rings to study the best conditions for tree growth and the most economic time to harvest in sustained-yield "tree farming." Without damage to the living tree, an increment borer obtains a core showing growth rings. Each tree species has its optimum elevation above sea level; some grow best in pure stands, others in mixed groves. Differences in soil types and in amounts of average moisture likewise show their effects in tree rings.

WING, ANDREW S. *The Insect Battle-Front.* Nature Magazine 37: 36–37; 48. January, 1944.

Insecticides are aids in the present struggle, not only in our gardens but on the battle-front. To help compensate for the loss of over half our supplies of derris-root (the main source of rotenone) from the South Pacific islands, Central and South America are developing greater yields of their rotenone-producing plants. Improved derris plants in Puerto Rico are giving high yields, while in South America the lance-fruit is being propagated and may prove an even better source of this insecticide. Pyrethrum, the toxic principle of a daisy-like flower, was produced formerly in Dalmatia; now it comes to us from Kenya, British East Africa. If its cultivation could be made commercially profitable, it could be grown in the United States. It is of wide use on the fighting front against disease-bearing insects. Nicotine sulfate, a tobacco by-product, is valuable mainly against sucking insects attacking plants. The mineral cryolite (sodium fluoaluminate) is a good substitute for the more toxic lead arsenate. These poisons are safe to use in the home garden if directions are carefully followed. Particular emphasis should be placed on using all dusts and sprays early in the season for greatest effectiveness.

RUTH SHERMAN STEIN

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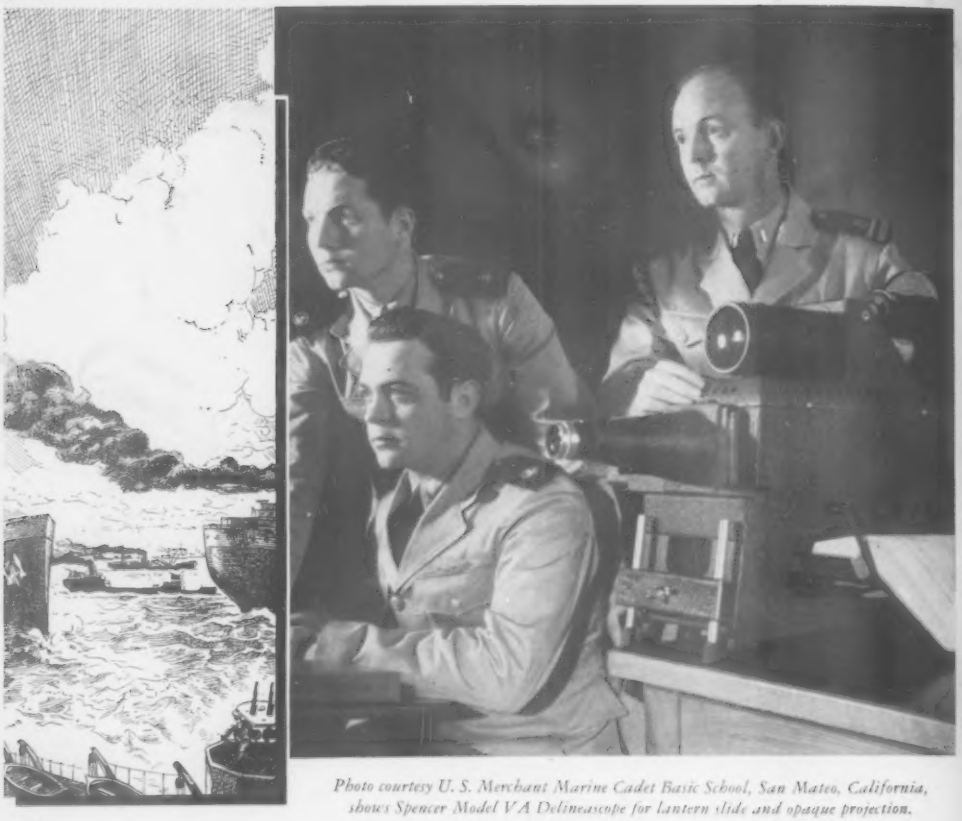

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